LID MAINTENANCE (Low Impact Development)

Department of Environmental Protection
Montgomery County Maryland

RAINSCAPES

Christy Ciarametaro, DEP Stormwater Planning Specialist

ESD / LID (Environmental Site Design)

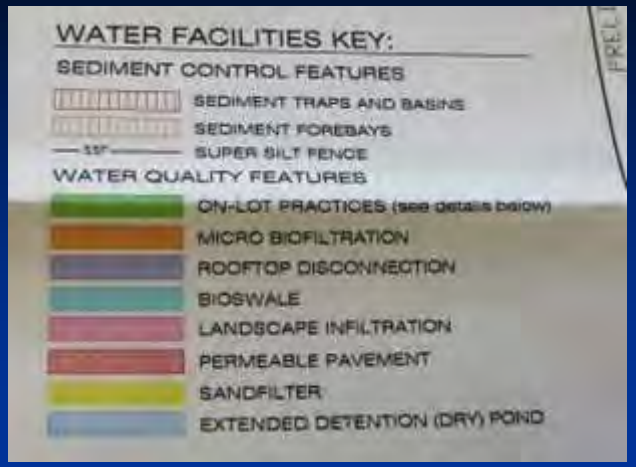
- small-scale practices for small drainage areas
- nonstructural techniques,
- better site planning to mimic natural runoff

Traditional versus LID/ESD

Typical Detention Pond

Micro-scale ESD Practice

LID Site


WATER FACILITIES KEY:
SEDIMENT CONTROL FEATURES
SEDIMENT TRAPS AND BASINS
SEDIMENT FOREBAYS
SUPER SILT FENCE
WATER QUALITY FEATURES
ON-LOT PRACTICES (see details below)
MICRO BIOFILTRATION
ROOFTOP DISCONNECTION
BIOSWALE
LANDSCAPE INFILTRATION
PERMEABLE PAVEMENT
SANDFILTER
EXTENDED DETENTION (DRY) POND

LID Techniques

Fallsgrove Shopping Center

ESD Practices

Alternative Surfaces

- Green Roofs
- Permeable Pavements
- Reinforced Turf

Non-Structural Practices

- Disconnection of Rooftop Runoff
- Disconnection of Non-Rooftop Runoff
- Sheetflow to Conservation Areas

Microscale Practices

- Rainwater Harvesting
- Submerged Gravel Wetlands
- Landscape Infiltration
- Infiltration Berms
- Dry Wells
- Micro-Bioretention
- Rain Gardens
- Swales
- Enhanced Filters
- Soil Compost Amendments
- Stormwater Planters
- Expanded Tree Pits
- Stormwater Curb Extensions
- Foundation Planters

LID In Montgomery County

- Bioretention / Biofilter
- Bioswale
- Dry swale
- Planter Box / Tree Box
- Porous Pavement
- Raingarden

Bioretention

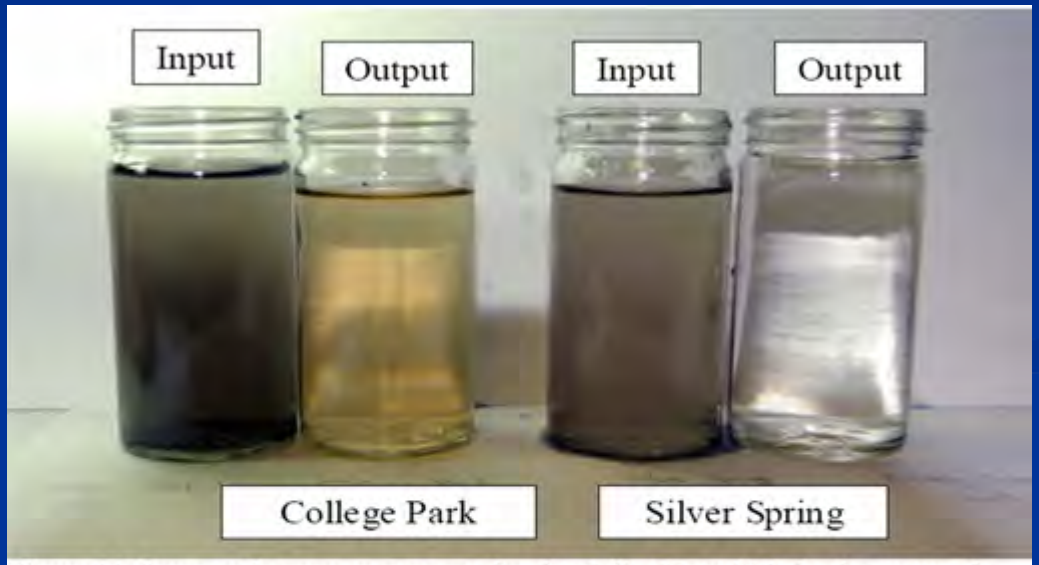


Figure 30. Input and output water samples for Cells CP and SS for the event of 4/3/2006.

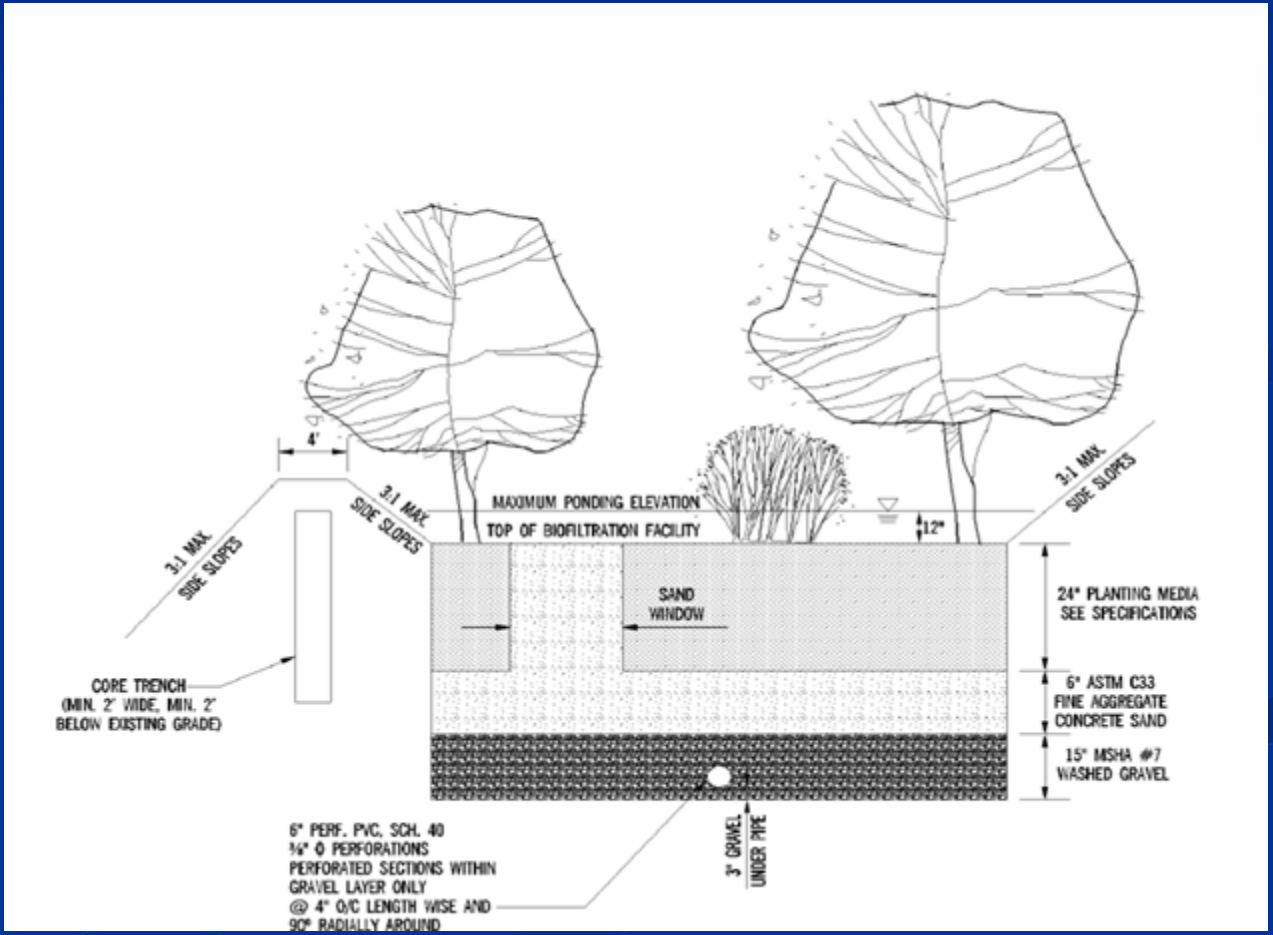
Bioretention Water Samples

Montgomery County Department of Permitting Services Standard Detail

Soil

- 1/3 Solite
- 1/3 Topsoil
- 1/3 Leaf Compost
- Less than 10 % Organic Matter
- Less than 10% Clay Content
- 30-55% silt
- 35-60% sand

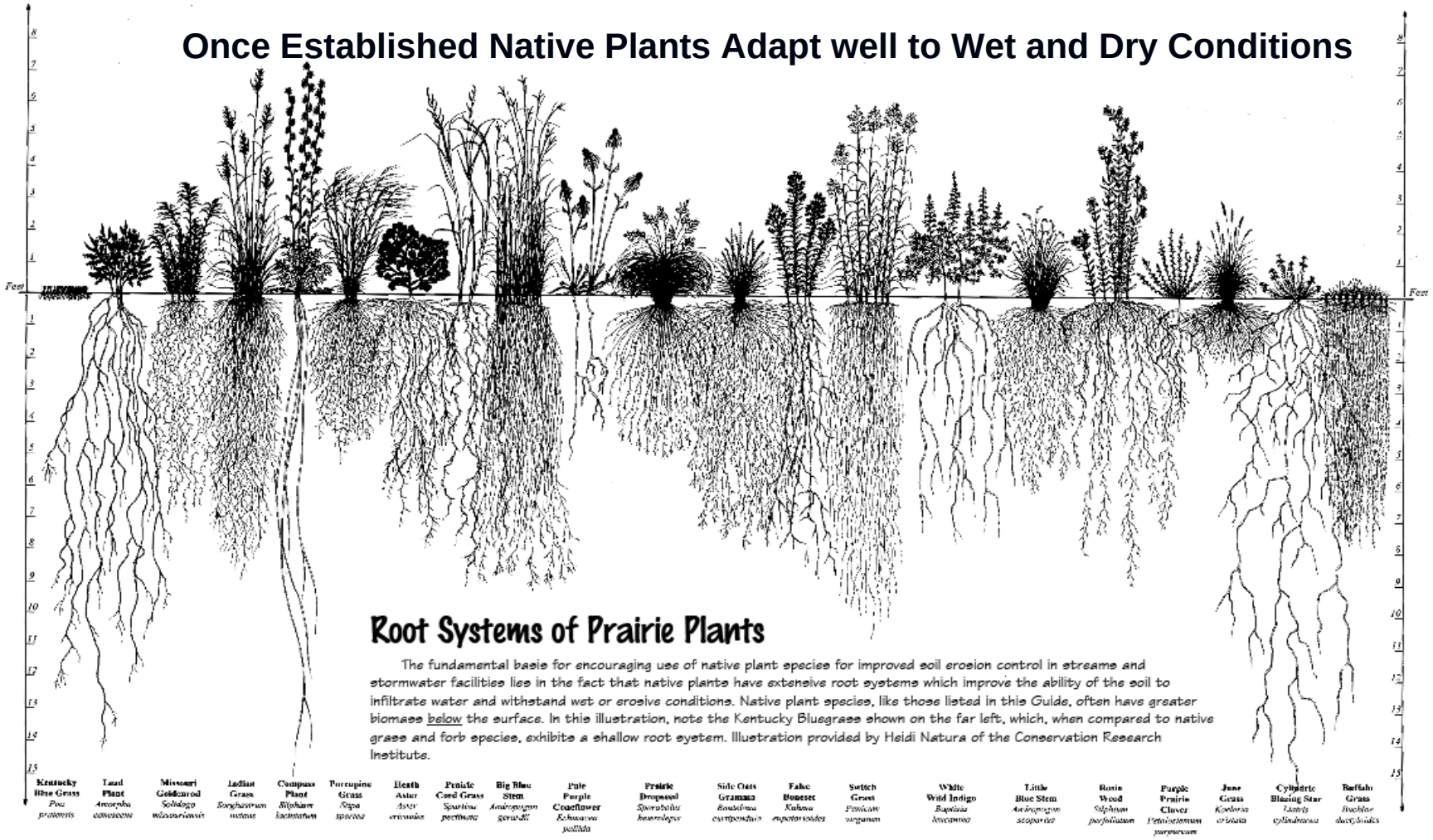
Soil Analysis



Bioretention Vegetation

Native Plants are Preferred

Once Established Native Plants Adapt well to Wet and Dry Conditions



Root Systems of Prairie Plants

The fundamental basis for encouraging use of native plant species for improved soil erosion control in streams and stormwater facilities lies in the fact that native plants have extensive root systems which improve the ability of the soil to infiltrate water and withstand wet or erosive conditions. Native plant species, like those listed in this Guide, often have greater biomass <u>below</u> the surface. In this illustration, note the Kentucky Bluegrass shown on the far left, which, when compared to native grass and forb species, exhibits a shallow root system. Illustration provided by Heidi Natura of the Conservation Research Institute.

Maintenance

Seasonal Differences

Potential Problems

- Remove dead plants
- Replace plants as necessary and water new plantings until well established

Need Adequate Vegetative Cover

Plant access is necessary

Verify plant numbers and health

Potential Problems

- Blocked Inlet

Potential Problems

- Unusual ponding (>72 hrs)
- Remove debris buildup

Prevent clogging

- Remove Sediment and Leaves on top of filter
- Check the whole bed as well as inlets

Prevent clogging

- **Sediment sealing surface**

Rapid, dynamic systems – Maintenance timing MATTERS

Sligo Rec center Rain Garden
Jan, April, May

Orange Painted plants are all the invasives to be removed….most of the planted plants had been weeded/ killed out

Sligo Rec Center

ONE MONTH'S DIFFERENCE

Montgomery County Weeds

- Weeding
  - Inevitably more in the beginning
  - Keeping up with it as it goes will reduce the overall effort required
  - More dense planting will reduce problem
  - Careful selection of mulch source

Bioretention Maintenance Snapshot

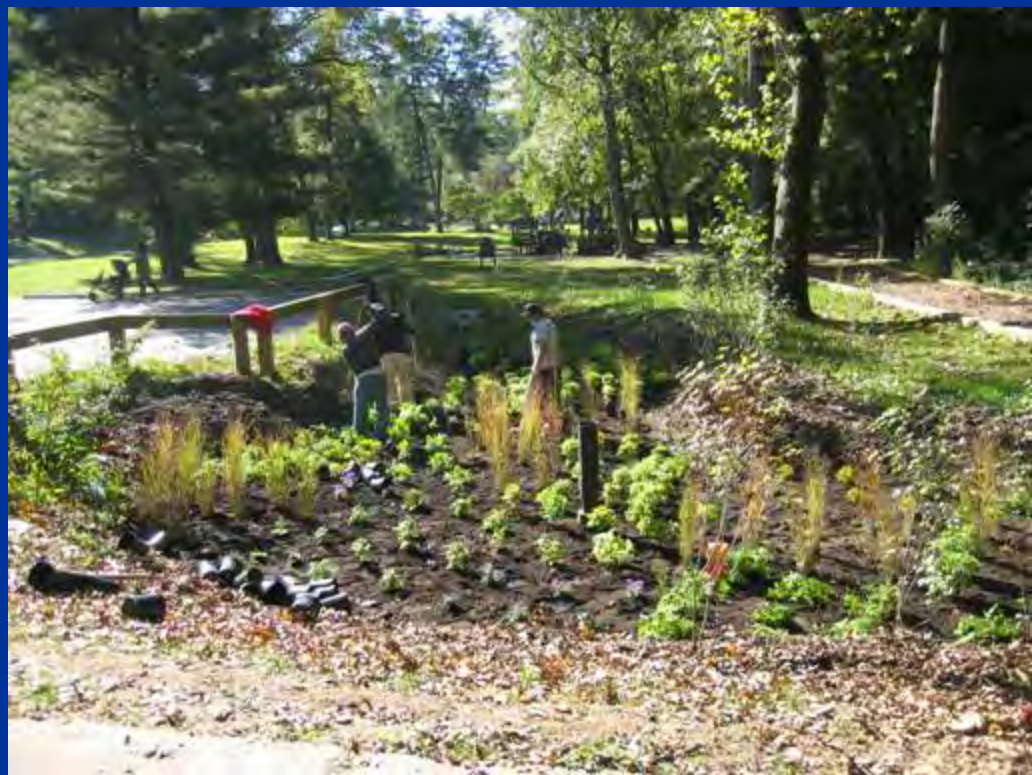
- Repair Edge problems or Erosion at Inflow– don't make side slopes too steep
- Watering to establish garden
  - Particular issue for Spring planting
- Weeding
  - Inevitable in the beginning
  - More dense planting will reduce problem
  - Careful selection of mulch source
- Mulching – 3" depth
- Pruning & Replanting

Nonstructural Maintenance Recommendations

- Traditionally landscaping, trash removal, mowing twice a year
- Seasonal/Monthly Maintenance for LID – Draft DEP Policy – Work in Progress

SPRING MAINTENANCE

- Check and remove trash, organic debris and sediment from cell
- Remove leaves from cell
- Weed – early control of the weeds will make weeding easier and quicker over time



SPRING MAINTENANCE

- Prune/cut back plants and remove cut material from the cell in early – mid April
- Replace plants as necessary and water new plantings until well established
- Maintain 3” Mulch depth

SUMMER MAINTENANCE

- Check and remove trash, organic debris and sediment from cell
- Weed cells (June, July, August) – keeping on top of the weeds will make weeding easier and quicker
- Water plants as necessary (> 4 weeks without rain)

Adjust mower blade height to avoid Scalping

FALL MAINTENANCE

- Check and remove trash, organic debris and sediment from cell
- Weed cell for the season
- Remove leaves from cell
- Do not dump leaves into cell

WINTER MAINTENANCE

- Check and remove trash, organic debris from cell
- SWITCH GRASSES – Prune Mid-March, not below 6 inches
- Winter Weeds
- Damage from winter snow removal

Raingardens

- Similar to Bioretention

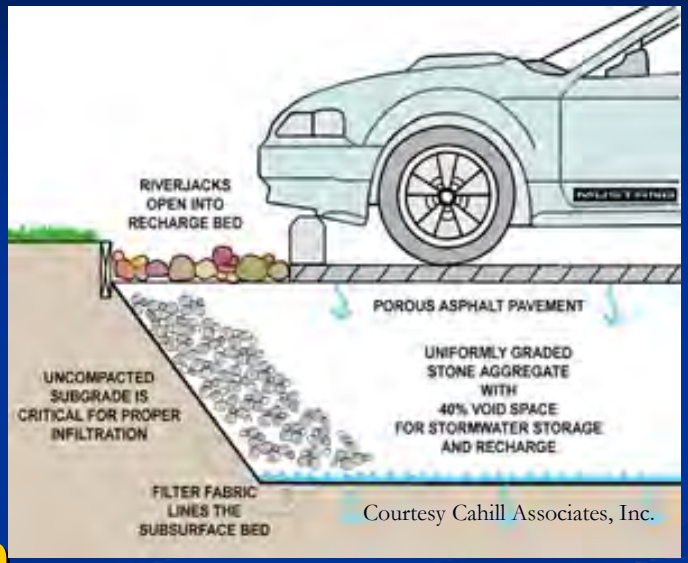
Sligo Creek Recreation Center, Source: MC DEP

Tree Box Maintenance

- Remove trash, organic debris from inlet throat and within the box
- Weed & Prune as necessary
- Water trees as necessary (> 4 weeks without rain)
- Monitor plant health/growth during regular maintenance
- Leaves can collect in the throat and usually buildup in November
- ** Filterra – mulch 2 times/yr*

Permeable Pavement

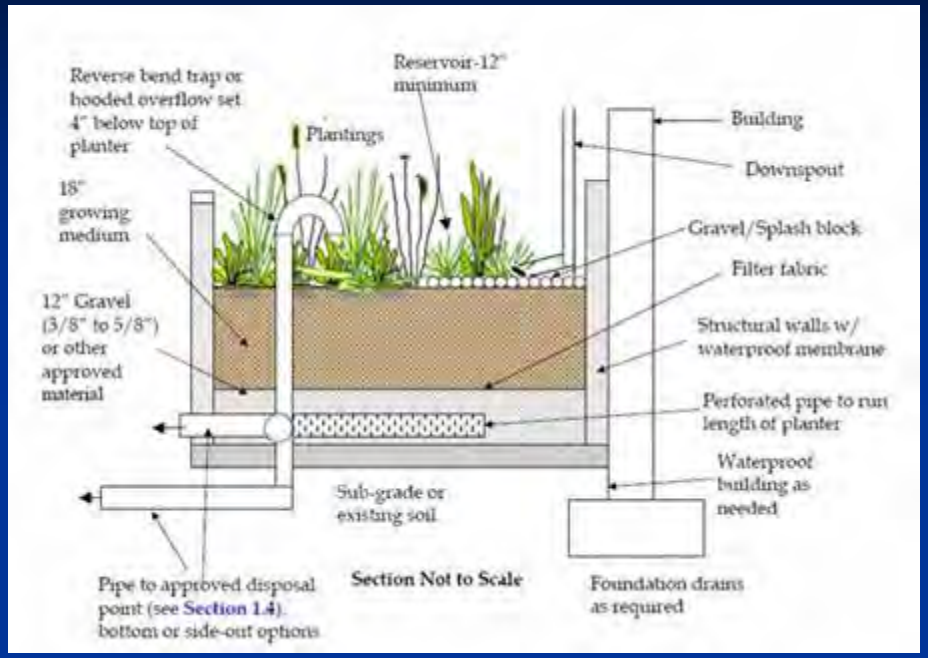
- Minimize clogging of void spaces
- Sweeping and vacuuming and/or pressure washing (depending upon source)
- Do not seal or repave with non porous materials




Source: NCSU


Source: ICPI.org

Planter Boxes



- Trash removal, sediment and debris removal
- Mulch 1-2 times/yr
- Weeding, care and replacement of plants
- Repair eroded areas
- Inspect planter box for structural integrity
- Inspect for ponding (>24hrs)
- Flush underdrain from cleanout pipe if necessary

Green (vegetated) Roofs

Inspect roof drains

Vegetation density

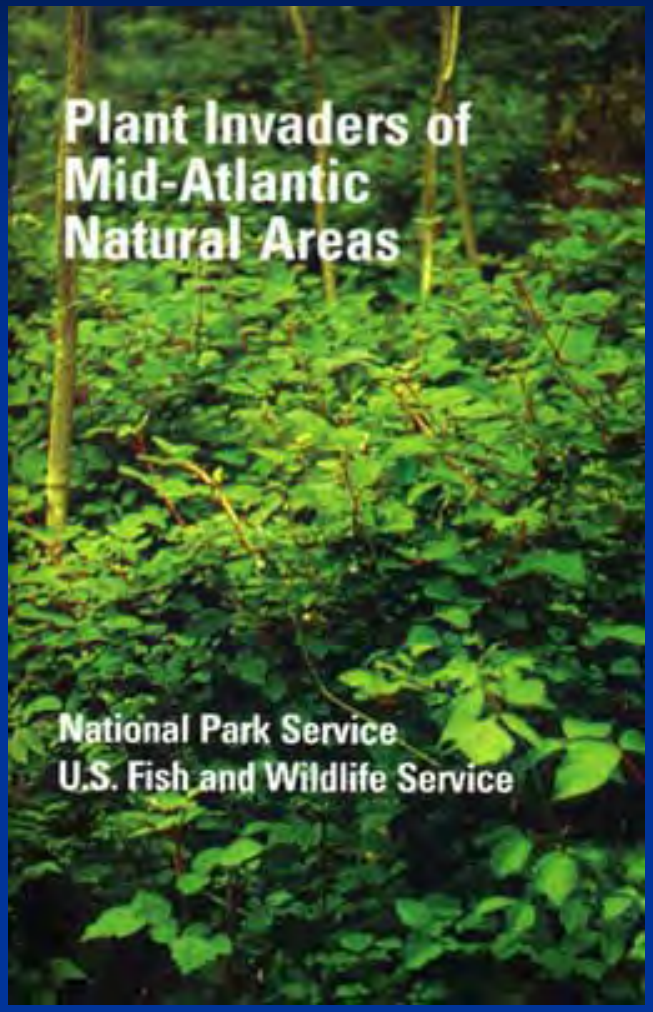
Dry Swale / Bioswale

- Mowing – if Switchgrass, leave at least 6 inch height
- Weeding

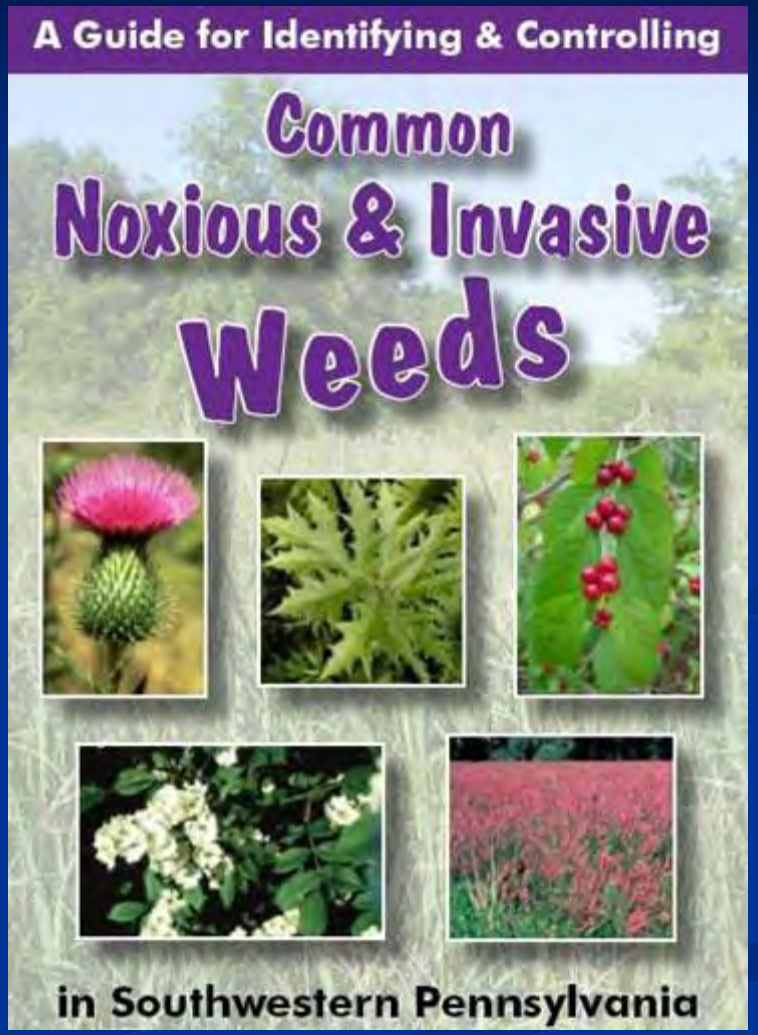
Fernwood Road dry swales

Colesville Health Center bioswale

Resources



- http://www.nps.gov/plants/alien/pubs/midatlantic/



- http://wcdpa.com/publications/SouthwestWeedGuide.pdf

http://www.ristormwatersolutions.org/SW_basicsdetail.html